TECHNOLOGY DEPT.

AUGUST 1955

The Approach

THE NAVAL AVIATION SAFETY REVIEW

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'As though you were going to walk back' — page 4

The Approach

THE NAVAL AVIATION SAFETY REVIEW

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Veteran Lockheed Test Pilot Tony Le Vier, author of "Landing the TV" on page 6, has been flying for about 25 years. So he speaks with experience on landing technique problems, which are important to every pilot. His article is the fifth in a series by test pilots. The previous articles featured landing of the *Banshee*, *Cougar*, *Fury* and *Cutlass*.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, 9 Dec 1954. This periodical contains the most accurate information currently available for aviation accident prevention. Contents should not be construed as regulations, orders or directives unless so stated. Material extracted from Aircraft Accident Reports, OpNav Form 3750-1 and Anymouse (anonymous) Reports may not be construed as incriminating under Art. 31, UCMJ. Names used in accident stories are fictitious unless stated otherwise. Photo Credit: Official Navy or as credited. Original articles may be reprinted with permission. Contributions are welcome as are comments and criticisms. Address all correspondence to Director, U. S. Naval Aviation Safety Center, NAS Norfolk, Va.

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From the Director...

a final word on departing

THE TERMINATION of a tour of duty is normally the occasion for a review of that tour. Any appraisal of the early development of the U.S. Naval Aviation Safety Center, from its beginnings as the U.S. Naval Aviation Safety Activity, to its present status as a Center, must include the observation that this growth was not without its share of problems.

To have participated in the early phases of such a mission has presented a challenge unique in its significance and in its potential. Within the space of one and one-half years the revitalized aviation safety program has *markedly* reduced the actual number of fatalities and aircraft accidents. Rarely indeed, is there presented the opportunity to be associated with an effort whose results may be measured in the saving of lives.

The concept of the revitalized aviation safety program was predicated on the fact that pilots, air and ground crewmen do not deliberately commit errors that lead to disaster. It is due to the complexities of modern airplanes and their associated equipment that command needs a helping hand in carrying out the myriad of responsibilities in the area of aviation safety, just as command needs operations officers, gunnery officers, material officers and the other department heads normally associated with squadron operations.

The objective of the Aviation Safety Center and the naval aviation safety program is to assist commands in all echelons in the prevention of avoidable accidents. A collateral and equally important objective of the Aviation Safety Center is to spotlight areas of weakness in the management, production, operations and material support of the Navy's air arm.

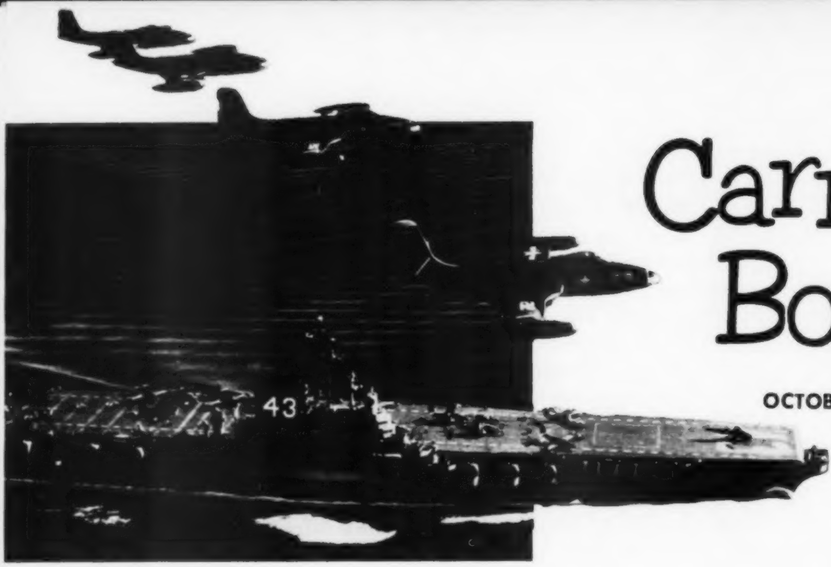
There is no panacea for the prevention of aircraft accidents. Prevention can be accomplished only by the sincere and continued willingness on our part to work as a team in this business on a day-to-day basis. This requires that each and every one of us——pilots, air and ground crewmen——understand and believe in the validity of and the need for this "new look" in aviation safety practices.

The Naval Aviation Safety Center can only give guidance to what is needed. The actual results obtained are the fruits of your labors and endeavors. Our outstanding success to date is a salutary reflection of the efforts of all hands in positive, vigorous aircraft accident prevention.

Happy landings!

J. W. Byng

J. W. BYNG



Carrier Box Score

OCTOBER 1954—MARCH 1955

CARRIER	RATE
CVA/CVS	
CORAL SEA	.7
ANTIETAM	.9
MIDWAY	1.3
INTREPID	1.4
LEYTE	1.6
WASP	2.4
ESSEX	2.6
TARAWA	2.8
LAKE CHAMPLAIN	2.9
YORKTOWN	3.0
HANCOCK	3.1
HORNET	3.2
RANDOLPH	3.5
TICONDEROGA	3.5
KEARSARGE	4.0
PHILIPPINE SEA	4.5
VALLEY FORGE	4.9
ORISKANY	5.0
PRINCETON	8.8
CVL	
WRIGHT	0
SAIPAN	0
MONTEREY	2.1
CVE	
MINDORO	0
BADOENG STRAIT	0
SIBONEY	0
KULA GULF	5.4
POINT CRUZ	7.7

THIS is the fourth Carrier Box Score to be published showing major landing accident rates for all carriers for the period 1 October 1954 through 31 March 1955. The tally for the previous period (July-December 1954) appeared in the *Aviation Safety Bulletin* for March 1955.

The rate for all carriers improved from 3.2 to 2.8, with 100 fewer accidents. Rates are based on major accidents per 1000 arrested landings.

The *Coral Sea* is to be commended for continuing in 1st place, which was accomplished with the second highest total of arrested landings. The greatest number of landings were logged by the *Midway*, which continued to hold 3rd place. The *Antietam* moved from 4th to 2nd place.

Major carrier landing accidents itemized by selected model aircraft are also tabulated here.

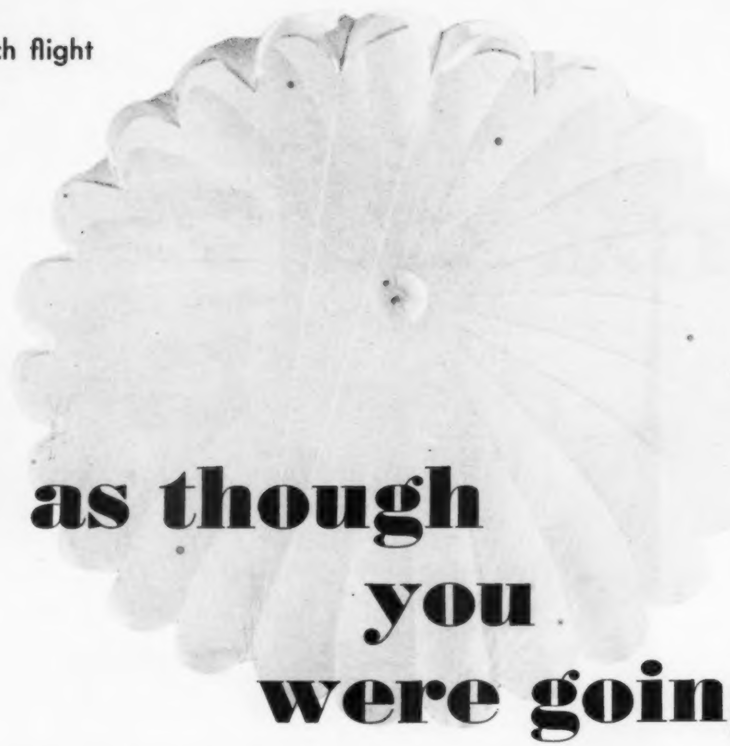
The overall improvement in the carrier landing accident rate is gratifying, and reflects much effort by all commands. Only through a sustained effort can the aviation safety program achieve a new low all-Navy aircraft accident rate of "3.5 in '55."

MAJOR LANDING ACCIDENTS FOR SELECTED AIRCRAFT ABOARD CARRIERS OCTOBER 1954 THRU MARCH 1955

Model A/C	F2H	F9F	F4U	AD	AF	S2F
Landing Accidents						
Hard Landing	4	20	4	8	2	4
Barrier Crash	8	30	2	18	7	1
Undershoot	2	9	1	0	0	0
Stall/Spin	0	0	0	2	1	0
Other	4	4	6	5	3	5
Landing Accidents Total	18	63	13	33	13	10

Flight Operations

Plan each flight



as though you were going

"WELL, SIR, when I decided to hit the panic button, I stirruped my feet, pulled the bailout bottle, blew the bubble off, yanked the curtain and got a terrific kick in the pants. When I pushed clear of the shoot-seat and pulled the D-ring I almost lost my brain-bucket because the chinstrap was too loose, but I was plenty glad to see that umbrella open. When I hit the drink, my poopy-suit plus my zoot-suit held me up until I toggled my Mae West. Then I blew up the rubber doughnut, crawled aboard, threw out a little dyemarker and shark-chaser, checked flares, mirror and whistle, and settled back to wait for the chopper, wishing I had a Gibson girl to keep me company."

Most readers outside the Navy will regard the above account as completely unintelligible gibberish—and perhaps quite a few in service might puzzle over some of the terminology. But to most naval aviators the picture would be fairly clear, i.e., the speaker quoted was merely recounting how he had ejected from his airplane, parachuted into the water, inflated his life vest and life raft and, after checking certain essential items of equipment, awaited the arrival of a rescue helicopter.

What may not be entirely clear to all pilots is the indicated value of the various items of the personal and survival equipment provided. Your protective equipment, the finest in the world, is of little value if you don't know how to use it. The fact that you may be the Navy's finest pilot does not eliminate the possibility that you can still be a victim of ignorance.

Consider this: The greatest single threat to your chances for a successful bailout or ditching lies in the lack of knowledge of proper procedure and use of equipment. Yet there is a definite tendency of pilots to take for granted the inspection and operation of the numerous items of equipment which he carries on every flight. So routine has become the process of donning oxygen masks, Mae Wests, helmets and the like, that the potential significance of these items is often neglected.

This sort of philosophy can be pretty lethal, as when a

Poopy suits suddenly become quite comfortable in a cold bath.

Don't ever let a flight become so routine that safety equipment is neglected.

to walk back!

poorly treated oxygen mask or unchecked CO_2 bottle suddenly become very essential to your existence. Neglected procedures can also become the difference between efficient, safe reactions and confused indecision when time is short and mistakes are not permitted.

There is one positive preventive for this latent threat to your well being: Treat your equipment and consider your procedures as though you were going to *use each item on each flight*. Expressed more familiarly in the words of long-experienced pilots: Plan each flight *as though you were going to walk back.*

Try this method for your next flight: Just ask yourself, "How would I go about using this piece of equipment in the situation for which it was intended?" The answer, or lack of it may be enlightening.

Meantime, to assist you in refreshing and relearning the tremendous potential of your personal equipment, this issue of *The Approach* includes information on various problems in this field of flight operations. Because the coverage is necessarily limited, the pilot is referred also to instructions and directives covering his equipment. Many of these are listed in the *Aviation Safety Planning Guide for 1955.* Your aviation safety officer has a copy.

If you are really concerned about your chances for being the oldest naval aviator, you'll continue your research in living, and *live.* ●

The test pilot talks on

landing the TV

By Tony Le Vier

I BELIEVE the easiest way to define a safe approach and landing procedure is to diagram the whole thing. I sketch out what I call the "ideal pattern." Probably there are some people who will disagree with me, but I feel this way about it. After 25 years of flying, everything from Jennies to jets, I still use the tried and true approach landing technique that was taught 'way back when—and I'm still here to discuss it.

Let's take a typical approach, following a long mission and with fuel down to critical limits. I can't fool around with more than one or two approaches and so, I plan everything carefully before I drop off all of my altitude.

My system has always evolved around the theory that it's easier to put an airplane where I want it by using a modified approach, than any other. By that I mean it's a compromise between the true power-off approach and the long drag-in with everything open but the windows.

One reason particularly governs my thinking along these lines. As speed and weight of aircraft continue this upward spiral, it will become increasingly necessary to utilize power for a safe approach. Sooner or later, power will be a must to complete a safe approach and landing. Therefore, while we're still on the borderline of such equipment, why not learn the logical technique until it becomes second nature? It's cheap insurance, believe me.

Now, let's take a typical pattern and landing in a TV-2. Whether you're a student pilot or an old hand, you still want to learn to fly this machine right. We assume you have a thorough working knowledge of the airplane and that the actual mechanics of flying are things already mastered.

The problem now remains, then, to bring the plane into traffic, establish a good pattern and then put the buggy down on the ground exactly where we want it. I don't mean a good one now and then, I mean good approaches and landings all of the time.

So you're coming down for a landing. What's the first procedure? Plan the pattern. I mean *plan* it. You've got about 15 knots of wind on the deck and it's coming almost straight down the runway.

On the upwind leg, over the runway, you've already lowered dive flaps and let the airspeed drop down to about 260 knots. About a third or possibly half-way up the runway you roll into the break. This doesn't have to be violent. Just make a nicely coordinated turn and keep it going for 180 degrees.

If you happen to be of the "two 90-degree turns" school that's okay too. No matter how you do it, make certain that you get the airplane on a definite downward leg and then reduce power to about 60 percent and get the gear and flaps down. Keep the altitude a constant factor and let the speed fall off normally.

Above all, don't wrack around through the early part of this maneuver like a madman. Sure, I know you may be hot. Possibly you even sizzle a little bit. That's swell. Save that stuff until you're upstairs. Down here in traffic, play it easy. You're not going to impress anyone with screaming tactics near the ground.

Once you're on a definite downwind and the gear and flaps have been extended keep the power at about 60 percent. Remember, acceleration time from 60 to 100 percent is reasonably fast. Acceleration from idle to 100 percent is too slow for safety. That's the most important thing to remember. Keep that mill turning in the upper speed ranges and you'll stay out of trouble.

The rest of the pattern is pretty much standard. Make a definite base leg and turn on final with ample speed. By that I mean, keep the airplane well above the stall range.

That doesn't mean that you should bring the plane in like a greased rocket, but do keep a reasonable head of steam on. Fly it at 115 to 120 knots, somewhere in that area. Keep enough power on to steady the airplane all the way down.

In the full throttle type of approach, gear down, flaps down, speed brakes open and throttle at or near 100 percent, the nose will be high. You'll feel as though you're hanging on the ragged edge of nothing. It just isn't comfortable. Bear in mind, I do not imply that this sort of approach is dangerous. I certainly do not. In fact, there may come a time when you'll have to drag one in, but, at the moment we're kicking around the subject of normal approaches.

Okay, now for the normal, partial-power approach. With the throttle set at say 60 percent, give or take a little, you'll find that the plane is extremely stable. The nose of the plane appears to be following the actual glide path and the rate of sink is minimized. Control is good and the airspeed is within tolerance. You have the feeling that you're flying the airplane correctly. Know why? Because brother, you are! That's the way the plane should be brought in. I think my diagram explains the approach clearly.

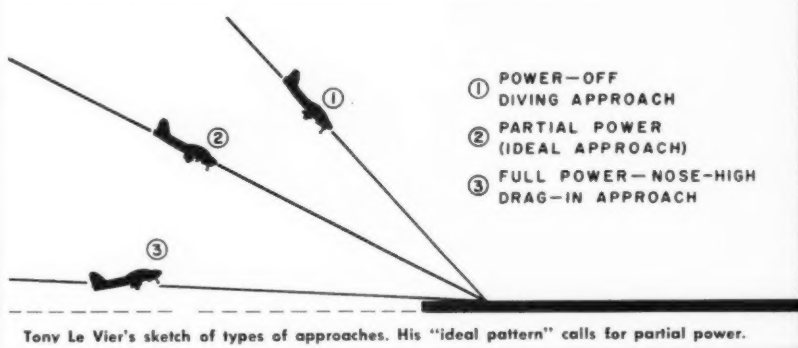
Right here I'd like to inject some positive thinking about glides. Every airplane has a definite flare factor. Usually this is based on power off in the landing configuration. This flare factor for the TV-2 is 1.35. Multiply this by stall speed—that's your minimum glide speed, power off. This will also work for a dead engine.

Suppose, for example, the stalling speed of your airplane is 100 knots and tests have established a flare factor of 1.35. Here's how you use it; 100 knots stall x 1.35 = 135 knots.

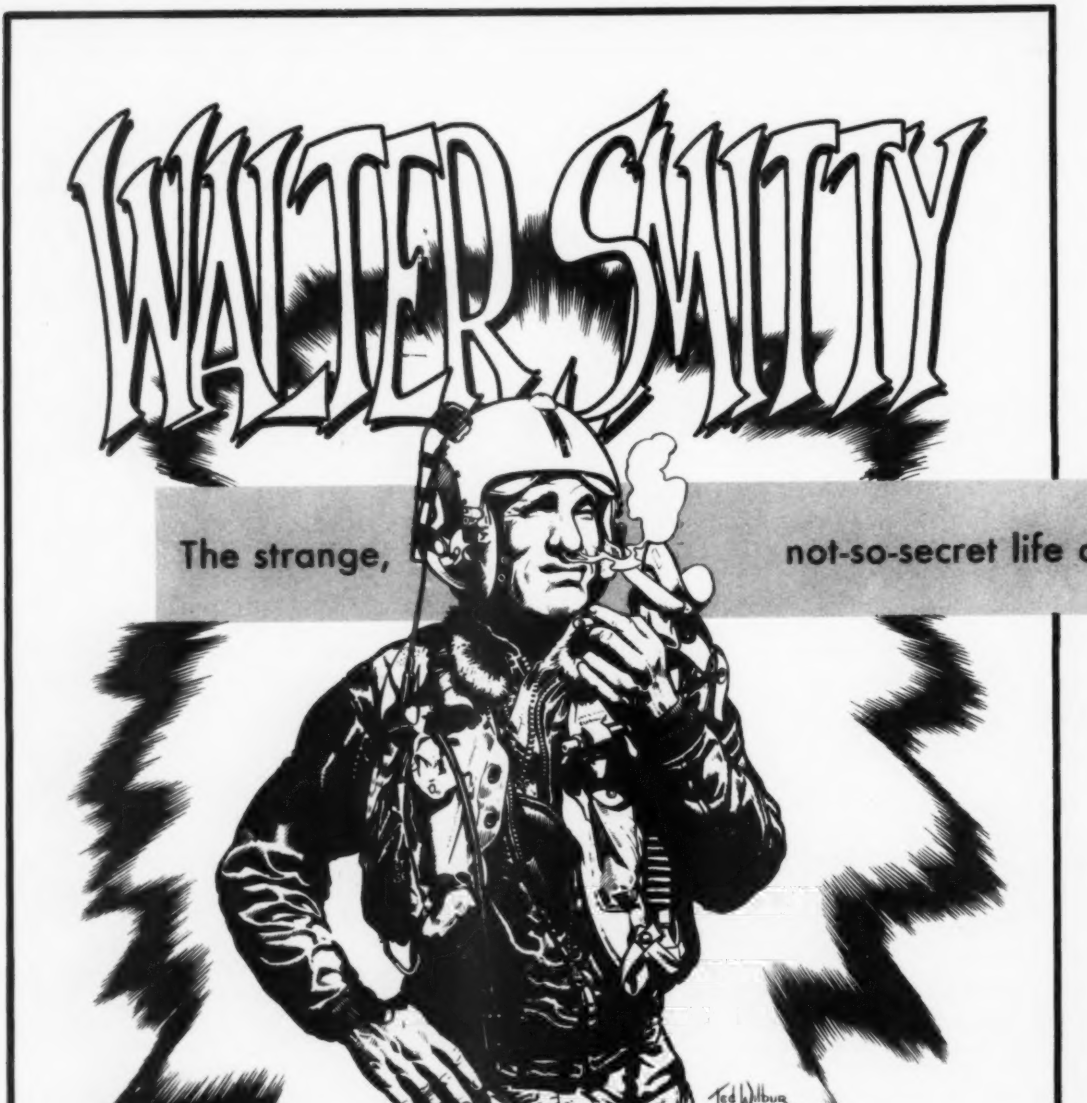
Every pilot should be familiar with the flare factor for the airplane he's flying.

Now, for normal power approaches. This flare factor changes. The higher the power the lower the speed. However, don't chop the throttle until the flare has been accomplished. By that I mean, hold things constant until you are assured of making the runway, then, as you start to ease back on the stick, ease back on the power.

Coordinate this action and you'll never go wrong. ●



Tony Le Vier's sketch of types of approaches. His "ideal pattern" calls for partial power.



The strange, not-so-secret life of Kill

air-to-air gunnery technique

f Killer Smitty.

POISED hawklike, high above the heaving blue of the ocean, LTJG Walter Smitty flashed a penetrating glance over his shoulder to where the enemy lurked. Smitty's eyes narrowed grimly as his piercing gaze pinpointed the target which slinked furtively along the cloudbank far below. In his charcoal blue fighter, LTJG Smitty's lips thinned in the familiar merciless line that was known and feared from Barin Field to Barber's Point — Killer Smitty, the Sky Scourge, hovering like an avenging angel — ready to strike again.

In the cramped confines of the cockpit Smitty glanced briefly, expertly, at his instruments: hydramatic pressure up, 25 pounds, plus or minus five; oil pressure fluctuating steadily at 3.5; altimeter caged; chronometer holding at 12 chrons, voltage meter arcing nicely; G-meter needle making its rhythmic sweep between the positive and negative pegs; guns charged, safety off; ejection seat armed and cocked.

Beneath his oxygen mask, LTJG Smitty's lip curled contemptuously around a cigaret whose ashes dropped unheeded into the 100 percent oxygen that hissed through the valve. Pock-a-pockta-pock.

This was it! With a single fluid motion, Smitty locked the controls and rolled his faithful FFV into a screaming dive towards the enemy. The growl of the mighty Wright and Whitney compound turbo engine increased to a challenging roar. Pocka-ta-pocka-pock.

Now! The ugly snouts of the machine guns spouted their nickelplated slugs in precise, oval patterns around the target. Closer, closer, the bullets were seeking hungrily for their mark. Then as the gun barrels drooped redly, Smitty shoved adroitly on the rudder. The big fighter slewed obediently to the master touch and the slugs found a mark. Pock-a-pock pock-a-pock. Metal and fabric ruptured.

Smitty's eyes were mere slits in the intensity of his effort. Abruptly he slapped the stick over and the swept-nose fighter rolled nimbly away, leaving a vaporous trail of popped rivets in its wake. Pocketa-a-pocketa-pock.

Smitty slumped far down in his seat—all interest suddenly gone. Unconsciously he lit a cigaret and as his reddened vision cleared he flashed a final glance back at the target. It still fluttered at the end of its towline, but the tow plane was wobbling uncertainly in the direction of its home base.

Over his earphones Smitty heard the wondering remarks of his fellow pilots. In the background of noise Smitty also heard the unrestrained voice of the towplane pilot.

Yawning slightly, LTJG Smitty flicked off his radio and lolled back against the seat, a tired and happy warior. Squinting at the sunglare, he reached up lazily and pulled down the face curtain.

Smitty had scored again....

Absurd? Maybe, but with due apologies to *Walter Mitty's* creator, James Thurber, the reader is reminded that the facts upon which this aviation safety fable was built were taken directly from a recent aircraft accident report.

This is rather puzzling because a number of carefully designed instructions, ranging from FXP-2 to squadron doctrine and "Sense" pamphlets, cover gunnery safety from every angle.

Gunnery practice in jet aircraft is essentially unrealistic as training for combat. This is due to the combat techniques required of jets (90 percent tail runs). Actual combat training is best accomplished by camera gunnery against other jets with the target plane unrestricted regarding evasive action. This type training requires complete familiarity with aircraft and should not be attempted until pilots have sufficient time in model to handle the aircraft in any altitude, speed, (at least 150 hours).

Therefore it is not only possible, but desirable to accomplish air to air gunnery with

WALTER SMITTY

(from page 9)

minimum hours in model. However, the nature of the exercise makes sound planning, excellent leadership and tight supervision essential. Relatively inexperienced pilots must be thoroughly supervised by experienced flight leaders until completely familiar with every aspect of the gunnery hop. It is not essential that the leader be an outstanding gunner prior to deployment, if he understands the factors involved and can lead a well conducted hop.

Normal, long-proven gunnery procedure must apply to every phase of aerial gunnery or somebody's feelings are going to be hurt—or worse.

The basic gunnery run is well described in *the Aviation Safety Bulletin* 10–54. However, the following items are perhaps refinements which have been used with outstanding results, particularly in squadrons with extremely low experience in model.

Fixed Ranging—Since the run is unrealistic and pilot experience generally low, this item is a great asset in permitting complete concentration on the target. Admittedly, in current gunnery competition where radar ranging is receiving increasing emphasis in squadrons using The APG-30 gear and the MK 16 installation, fixed ranging has a somewhat subordinate role. However, for initial gunnery flights, fixed ranging approaches permit the pilot to devote more attention to the mechanics of flying a smooth, consistent pattern.

Three-plane firing groups—Whenever the considerations of high utilization of towplanes permit, the three-plane firing group is considered ideal. This system almost eliminates the possibility of mid-air collision between the recovering airplane and the one starting its run, since the recovering pilot can generally concentrate on his position relative to the banner.

Sight recording cameras—Use of these cameras, and immediate developing and viewing of film under supervision of the leader will disclose errors immediately without involved evaluation equipment. Cameras must be rigged to show approach to the banner and when the trigger is pulled.

Pattern — Prior to loading guns, the gunnery pattern must be learned completely. Hits are generally a function of pattern. It is dangerous and of no advantage to load guns prior to mastering the pattern.

Permanent flights—Set up an organization prior to deployment and if possible, let it stand for the duration of deployment. The present doctrine of providing a graduate of the Fleet Air Gunnery School to each squadron should aid materially in promoting correct techniques.

Trim — Trim the airplane for boresight speed. Perfect rudder trim is essential. Presetting elevator trim will eliminate one other distracting factor for an unexperienced pilot.

Break off distance — Move in to the banner slowly, utilizing film to show the pilot day by day the distance at which he is breaking off. If a pilot is reluctant to move in, thinking he is closer than he actually is, a check pilot can be used to advise by radio the range at which he is breaking off. Tow line length can be compared to firing aircraft distance from tow to provide highly accurate estimates of this distance. When this is considered necessary, give the pilot a warmup hop without loading the guns.

Estimation of distance—The only accurate method of estimation of range is pipper size compared to banner width. This cannot be stressed too much. Once a pilot is convinced he will normally move in to correct range confidently.

Boresight—Give the pilots a break by insuring that boresight is perfect and gunsights are operating properly. A perfect run will not produce hits unless the equipment is maintained perfectly. Boresight at firing range rather than at short distances, and re-check boresight every third day. Let one person boresight all aircraft and have pilots check the boresight after setting.

It is fully realized that many of the above procedures are artificial. However, each will serve to lessen the distraction in the gunnery run and will give the new pilot a better chance to compete with more experienced personnel. While competing he will learn to fly the aircraft by his senses, and proficiency will follow in all phases of his training.

Banner collisions are the product of over-zealous attempts to get hits.

It has been said that one month of intensive gunnery training will make a group of individuals into a squadron. This has been done in many cases without a single banner collision in thousands of passes. ●

Test Pilot Jim Pearce of North American conducted a series of special flights to establish a positive approach to the problem of spin recovery in the *Fury*.

spinning the FURY

By Jim Pearce

THE FJ-2 and FJ-3 *Fury* airplanes have been thoroughly spun with the gear and flaps up and down, speed brakes open and closed, and under each of these conditions with the 200-gallon external tanks-off, on-and-empty, and on-and-full.

The airplanes have consistently demonstrated their ability to recover from any of those spins using standard recovery techniques. During all of the spin testing conducted by North American Aviation, Inc., on the *Fury* as well as its Air Force counterpart, the *Saberjet*, no spin has ever been encountered from which recovery could not be promptly accomplished by normal spin recovery techniques. In fact it is difficult to hold an FJ in spins under certain conditions.

Spins can be encountered by stalling the airplane in level flight and applying hard rudder one direction or the other simultaneous with full back stick. Or they can be encountered during turning flight at any speed up to .9 mach number, at the higher altitudes, by pulling too tight in a turn, causing an accelerated stall, and simultaneously applying rudder one direction or the other. If spins should be encountered under either of these conditions immediate neutralizing of all controls will halt the spin if this action is taken before one complete turn is completed. If a fully developed spin is allowed to occur by maintaining prespin controls recovery can still be affected using standard recovery techniques.

Remove Aft Trim

Remember, to recover from any type of spin in an FJ airplane the pilot should neutralize the stick and ailerons immediately, and simultaneously apply hard anti-spin rudder. Neutralizing the stick does not necessarily mean returning it to its trim position for the FJ airplane will not recover from a spin unless the stabilizer is moved further forward than

Jim Pearce, North American Test Pilot

A World War II Navy fighter pilot, Jim Pearce went thereafter to Patuxent River to Flight Test, Naval Air Test Center. He left the Navy in 1948 to become a test pilot. At North American he has done extensive testing in the AJ, F-86, B-45, and FJ.

the stabilizer setting obtained with full aft trims; otherwise, reversing the rudder will merely reverse the direction of the spin.

A maximum force of only 40 pounds is required to move the stick fully forward when the airplane is trimmed full nose-up and even in a well developed spin full anti-spin rudder requires only 160 to 200 pounds. Therefore, there are no unmanageable forces involved in affecting satisfactory spin recoveries.

It is not essential that power be reduced after entry into a spin but the reduction of power to idle reduces the altitude loss per turn.

If, at any time a pilot in a spin becomes confused, the best thing for him to do is to release all controls, *provided* that he has not trimmed into a turn prior to spin entry. A good rule of thumb is to never find yourself in this situation by *never trimming into a turn.*

Inverted Spins

Inverted spins might occur if the airplane should stall during the inverted portion of a maneuver. The inverted spin can be recognized by a roll from an inverted position over to what appears to be a normal 45-degree dive during each turn. Recovery can be made at any time by neutralizing the controls and flying the airplane out of the spin at the time that it is upright.

Spins with droptanks installed are for all practical purposes, identical to clean airplane spins except that if rudder is not purposely applied as the airplane stalls in an accelerated turn, the airplane tends to perform a snap roll in the opposite direction of the turn. If rudder is applied at this point, as it would be through normal pilot reaction to stop the spin, and the stick is *not* neutralized the airplane changes direction and spins toward the deflected rudder. A snap roll and a spin are the same thing except that the rotating axis of a snap roll is horizontal and that of a spin is vertical.

Two Types of Spins

Two different types of spins can be encountered in FJ series airplanes.

One type is a steep slow rotating, hesitating spin during which the airplane rotates at an average rate of 50 degrees per second, loses about 2000 feet of altitude clean or 2700 feet altitude, tank-on, per turn, and recovery from which requires 1/4 to 3/4 of a turn after simultaneously placing the stabilizer to about zero degrees deflection and the rudder to a full anti-spin position.

The other type of spin encountered is a type that is much more oscillatory in nature (the nose rising as much as 45 degrees above the horizon and dropping beyond the vertical in the first turns of an accelerated entry) and much steadier with respect to rotational velocity, during which the airplane rotates at an average rate of about 120 degrees per second, loses about 1600 feet of altitude clean or 2400 feet of altitude tanks-on, per turn. Recovery requires from one to two turns simultaneously placing the stabilizer to about zero degrees deflection and the rudder to the full anti-spin position.

A marked increase in rotational velocity occurs after the

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controls are placed in the recovery positions during this second type of spin. The number of turns required to affect recovery after the application of recovery controls depends on the presence of external tanks and the amount of fuel carried in them. The airplane will recover with tanks-on-and-empty in one to $1\frac{1}{2}$ turns and with tanks-on-and-full in two turns from a fully developed spin.

Fast at the Last

It is important to note that spin recovery is progressing satisfactorily when the spin is noted to speed up markedly after the application of recovery controls. Therefore, it must be remembered that controls should not be moved during spin recovery simply because the rate of spin rotation has rapidly increased. This is a good sign and an indication that recovery will occur within one to two turns. Do not move the stick full forward during spin recovery as this will cause a very abrupt negative acceleration and force the airplane to a somewhat greater nose-down position than vertical. This causes excessive altitude loss during recovery.

Remember then, that if a spin is encountered in an FJ series airplane, recovery *can be* effected regardless of whether the airplane is flying flaps up, flaps down, speed brakes open, tanks on or off by simply neutralizing the stick and applying hard anti-spin rudder. It should be noted here that the ailerons must be neutralized to effect satisfactory spin recovery with external tanks installed. The airplane will not recover from a spin with external tanks on with the ailerons held against the spin. The airplane will recover from a spin with the ailerons held *with* the spin. However, the recovery is hard to distinguish because the airplane continues to roll at a rapid rate due to the deflected ailerons. So remember to always neutralize the ailerons for best spin recovery.

Editor's Note: As pilot Pearce has concluded, spin recovery in the FURY should be relatively easy to accomplish. However, as in any airplane, the undue prolongation of spin recovery may indicate a particular situation involving some form of material malfunction or failure. In such an event, which might require the pilot to eject, FJ commands are urged to employ exhaustive investigation to establish the possibility of control malfunction or other abnormality. Only in this manner can the general store of experience be increased and the accident prevention capability continually improved.

To help prevent any further accidents resulting from spins the following information and recommendations are offered:

★ Do not trim into a turn.

★ If the airplane snaps out of a turn at any speed, enters a spin from a low-speed straight-ahead stall, or enters any form of a spin type maneuver, *neutralize the stick and apply opposite rudder simultaneously.*

★ It is of utmost importance that the stick be brought forward so that the stabilizer is at approximately level flight, one-G trim in the clean condition. *Recovery cannot be reliably effected if the stick is held back.* Also because of recovery attitude and excessive altitude loss during recovery, *full* forward stick is *not* recommended.

★ If confused as to what recovery technique to use, release all controls, *provided* the airplane is not trimmed excessively nose-up.

★ Remember that the *spin rotational velocity increases during recovery.* Therefore, don't let this mislead you into thinking your recovery technique is ineffective.

★ After rotation has stopped be certain to have sufficient airspeed before initiating any pullout. If gear and flaps are down during the spin, take care not to exceed gear and flap down speeds during recovery.

★ To minimize altitude loss in the spin and recovery retard the throttle to idle at the beginning of the spin.

ANYMOUSE

HYPOXIA

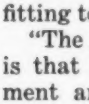
Anymouse, an instructor, passed out at 35,000 feet in a TV-2 with no pressurization. Unconsciousness was apparently caused by a partial or complete disconnecting of the Erie quick-disconnect fitting.

Fortunately, for Anymouse, the student pilot made an emergency descent to 1000 feet where the pilot regained consciousness. The plane was landed at the nearest facility and Anymouse was placed under medical observation for 24 hours. No ill effects were sustained.

Anymouse stated: "The insidious effect of hypoxia prevented my completion of an oxygen check before blackout occurred. I should have manipulated the dial to safety and/or actuated the bailout bottle." He continued, "I did make oxygen checks before leaving the line, before takeoff, during the climbout and at leveloff. No malfunction was observed on any of these occasions and the blinker matched my breathing motions.

"I was doing an abnormal amount of movement within the confines of the cockpit in an attempt to remedy the lack of pressurization and believe this to have caused the Erie fitting to become disconnected.

"The ironic part of this tale is that I was aviation equipment and survival officer of my squadron."



FRIENDSHIP ? ? ?

Anymouse flew an F3D to an aircraft factory to pick up a very good friend and fellow pilot. His friend did not have a helmet and mask. The company people scrounged around and found an Air Force helmet and mask that fit. The F3D was manned just before sunset.

The weather was reported CAVU until nearing their home base where scattered thunderstorms were forecast.

Anymouse asked his friend if he would like to fly. The friend had flown commercial air to the plant. He had only 6 to 10 hours in the F3D and was eager to fly it to become more proficient. It was discovered then, that the mask had no microphone and the helmet's earphones would not fit the electrical connector for the standard Navy fitting.

"Well, I guess you'll have to fly it," said Anymouse's friend.

Anymouse stated, "Had it been with anyone else and under any other circumstances, or if the weather had been expected to be poor I would have traded seats then and there. However, I had lots of confidence in my friend's ability and judgment so I gave him my helmet and mask.

"When the trade was made he could talk and hear whereas I could do neither. We took off, climbing to 35,000 feet, and headed for home with darkness closing in. Everything was fine until we neared our destination and received reports of a thunderstorm southeast and other storms scattered in all quadrants. The approach control cleared us to descend to 20,000 feet.

"My friend started the descent and then things went to pot. His lack of jet experience began to show. He didn't realize that to get down to 20,000 feet in the short distance between our position and home base he was going to have to go down fast—about 4000 feet per minute. About this time we went into clouds for the

and his hairy tales

first time and they turned out to be the forecasted storm. This caused the ADF to become erratic to the point of uselessness. From then on it was a nightmare. I couldn't hear so didn't know what he was hearing. He didn't have time to read notes. He was confused by the high speed and altitude transitions. He had never practiced or even been briefed on jet penetrations and letdowns. We turned south finally, somewhere in the vicinity of our base and within a couple of thousand feet of 20,000. This put us in the heart of the storm . . . rain . . . sleet . . . turbulence . . . St. Elmo's fire . . . We both got somewhat panicky. He, because he didn't know what to do and I because I couldn't do anything! Not even hear or talk.

"He played with the divebrakes and just in time, saw his airspeed nearing 100 knots. We went up and down and sideways, lashed by the storm and erratic flying. At one point he turned to me and screamed something about trading places. I didn't see how we could! Fortunately we had plenty of gas and I prayed that he would steady down. His old training and experience finally took over.

"I found later he got himself under GCI control. He stayed at 12,000 feet and began to take GCI directions and eventually the whole thing come out . . . an exciting landing in the rain but no damage.

"We both agreed that this was the most hair-raising experience either of us had ever had in an aircraft and that we were lucky to be alive. He spent the next few days learning all about jet penetrations and approaches and I resolved to be much less generous in the future about giving up the left seat.

"I'm sure neither of us would ever again start out on an F3D flight with one pilot having a helmet-mask combination through which he could neither hear nor talk, and especially with one whose entire experience was gained in the right seat.

ALMOST HAD IT

"I was attempting a night IFR approach and landing at Maxwell AFB in a TV-2" said Anymouse. "While in the procedure turn outbound at 2500 feet, the rubber band holding my letdown chart to the knee board broke and the chart fell to the cockpit deck. I reached down to pick it up and my next look at the instruments brought a chill of horror. The needle was against the left peg, the gyro horizon was showing an eight ball and the altimeter was plummeting downward!

"I felt I was in a right bank and pulling excess G . . . my first experience with severe vertigo.

"By the time I grasped the situation, the altimeter was down to 1500 feet. After applying full right stick followed by back pressure, I broke through the clouds at about 600 feet nose-down, in a steep left bank. Knowing that the terrain was roughly 200 feet, I shut my eyes and said a prayer with 300 feet showing on the altimeter. How close I came to the trees I'll never know. Upon opening my eyes I had 1500 feet of altitude and a 4000 feet a minute rate of climb. I leveled out and continued a very shaky approach and safe landing at Maxwell.

"I had memorized the approach procedure before taking off and will never know why I was so bound to pick up the letdown chart at such a critical time." ●

Some foods are potential hazards to flight safety.

Safety Council Notes

Excerpts from the minutes of recent aviation safety council meetings . . .

Medical Committee, MCAS El Toro—The type of food served pilots at the general mess was discussed, noting that menus containing quantities of gas-forming foods which cause distress are potential hazards to flight safety. Flight surgeons are to instruct squadron personnel in desirable eating habits of aviators, stressing adequate protein type breakfasts.

Air FMF Pac—This command has definitely established that the billet of aviation safety officer on the staff of this headquarters would be a full time billet. It was also recommended that consideration be given to establishment of a mobile tower to be used at the end of the service runway to assist pilots in emergencies and to warn of dangerous situations. The group also noted that a recent midair collision demonstrated the need for frequent review of emergency procedures by pilots. In this instance a pilot saved his life by immediate application of the correct ejection procedure.

Air Operations Committee, MCAS El Toro—This group is publishing the reports of its meetings including an itemized resume of violations of local flying rules at MCAS El Toro.

Air FMF Pac—The medical committee of this command reported two incidents in which pilots did not appear to be familiar with the use of oxygen. In one incident the plane departed with between 900 and 1000 pounds of oxygen. Four persons were using 100 percent at an altitude of approximately 16,000 feet on a scheduled 23,000-foot flight. The oxygen supply was depleted, but in this case the flight was discontinued for another reason. An inadequate supply of oxygen on takeoff and the use of 100 percent oxygen should have been recognized

Fuel tanks drop-checked weekly for rust.

as not permitting completion of the flight. The other incident involved the failure of a pilot to use oxygen on ascending to 25,000 feet. A passenger noted the anoxic condition of the pilot and was able to get a mask on the pilot before serious conditions resulted.

Air FMF Pac—Groups operating jet aircraft have positioned a pilot qualified as a division leader and equipped with a two-way radio, at the landing end of the runway to supervise jet approaches and landings.

Fleet Air Guam—Following recent tests the NAS here has adopted a policy of drop checking (on the ground) external droppable fuel tanks weekly. Several instances have been observed during these tests in which the bomb racks supporting the fuel tanks had become so badly corroded within a short period of time that they would not release. In one case even the emergency hydraulic release failed to free the tank. The maintenance and material committee pointed out that all maintenance officers should check their maintenance programs to insure that all possible malpractices are eliminated, and directed attention to the following: TO 49-54, Daily draining of aircraft fuel systems to remove water and to detect foreign matter; TO 1-55, Cleaning of hydraulic shock struts and actuating cylinders; TO 48-54, Utilization of aircraft engine fuels.

FLogWing Lant/Cont—This group recommended reemphasis on danger of accepting aircraft with what might seem to be minor discrepancies. Caution was also made against the malpractice of continuing ferry flights when the aircraft is in need of maintenance repair. Where practical it was urged that ferrying of small trainer helicopters be conducted as a group flight of at least two helicopters with a qualified helicopter mechanic accompanying the flight in a conventional aircraft. Past experience indicates this practice justified whenever practicable.

1st MAW, AFMF—This command reported a slightly lower accident rate than for the previous two quarters and noted that experience level of pilots involved in accidents ranged from a high of over 7000 hours to a low of 376 hours. Reference was made to the First-Tour-Pilot-Caused-Accident Analysis published by the NASC which confirms the need for close supervision of the many first tour pilots in 1st MAG Wing. The Wing maintenance officer pointed out that carelessness and lack of attention to small details was the most prevalent cause of material failures, and that the changeover of mechanics from one model aircraft to another creates added need for close supervision in that area of operations.

FLogWingPac—Reports were cited of overhaul activities installing an ADF control box at the navigator's station in the R6D which has an unguarded push-button to effect transfer of control from the pilot's station to the navigator's station. AirTransRon 21 reported two occasions in which control has been inadvertently transferred from the pilot during VFR approaches. The Council considers this a safety of flight item in that control could be inadvertently transferred during an IFR approach without the pilot's knowledge. FLogWingPac advises all squadrons operating R6D aircraft to observe due caution in this configuration and to establish interim safety procedures.

Helicopter ferry flights pose problems.

Supervision of jet approaches pays off.

Truth and Consequences

VF

F2H

STALL/SPIN—Returning from a three-plane familiarization flight in a F2H-3, the pilot made a slow approach, the airplane settling into the ground approximately 15 feet short of the runway, striking the ground in a nose-high, left wing low attitude. The gear was torn from the plane on impact. Progressive overhaul damage occurred as the aircraft slid down the runway in a slight arc. No injury to pilot.

The investigation revealed that the pilot, from the 90-degree position on, made his approach too slow. He did not realize the dangerous altitude and attitude of the aircraft until too late, and evidently no corrective action was ever taken. By retarding the throttles at a slow speed, the pilot caused the aircraft to enter a partially stalled condition.

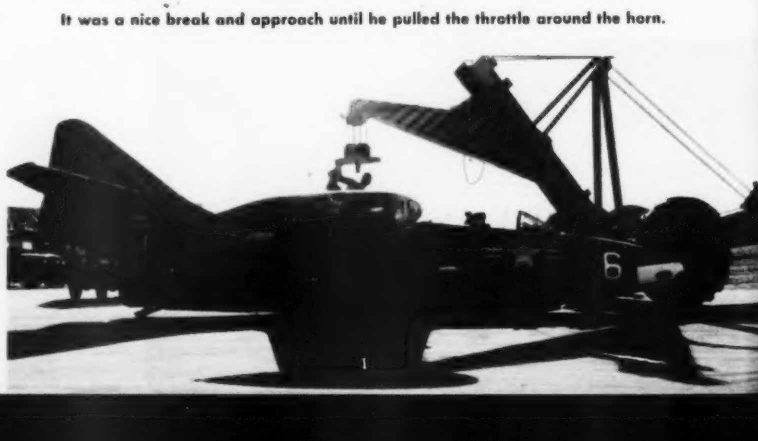
The pilot's neglect of the basic rule of airspeed control resulted in an expensive demonstration of another trite-but-true aviation axiom: "The plane won't fly without flying speed." ●

F9F

CONFUSION OF CONTROLS — Pilot was returning to base after day simulated interdiction in his F9F-5. After break, and a 180-degree position, with approximately 1000 feet of altitude, the pilot noted a loss of aileron boost. He discovered that in retarding the throttle he had pulled it around the idle stop to the closed position. The pilot attempted no airstart. He turned on the emergency hydraulic pump and put the gear handle down. The pilot continued his approach and touched down with gear, flaps and dive-brakes up at the 2000-foot mark on the runway. The aircraft suffered overhaul damage, class B, the pilot none.

Analysis revealed that pilot did not use cartridge airstart, which it is believed would have been successful. It is further believed that actuation of the emergency air bottle to complete lowering of the gear, would have been successful time and space-wise, since the plane first touched down 2000 feet from the beginning of the runway. Pilot was commended for excellent airmanship in getting aircraft down safely in view of his limited experience. However, all pilots are to be cautioned about careless handling of vital controls, such as the throttle. In view of the number of such accidents, the board recommended that designers attempt to provide a more positive mechanical device to prevent inadvertently putting the throttle in the cut-off position. ●

It was a nice break and approach until he pulled the throttle around the horn.



VA

AD

BARRIER CRASH—Prior to the accident, pilot had just completed five successful AD landings. On the approach to the sixth, pilot was picked up by the LSO at the 45-degree position with a Roger signal. He continued his approach and was slightly high just prior to entering the cut position. He was given a high, followed by a Roger, then the cut. In answering the high signal, pilot nosed over abruptly and did not flare out soon enough. Realizing this, he applied full back stick causing the tail to hit forcefully, short of the number one cross-deck pendant. This drove the hook upward into the tail section and caused the tailwheel to break off. The aircraft continued up the center of the flight deck with the arresting hook clear of the deck and engaged No. 2 and 3 barriers. Strike damage resulted to the aircraft.

The board concluded that the pilot's inexperience was the cause of his overcorrection in diving for the deck after the cut. It was recommended that each pilot be continually warned of the dangers of trying to get on the deck too fast, either by diving or easing throttle while in the groove. Constant supervision of all pilots landing techniques while doing FCLP was also recommended. ●

A dive for the deck and an abrupt flare washed out this AD.

VP

PBM-5

HARD BOUNCE—The failure of the bombardier's window in PBM-5 after a hard bounce and a subsequent landing, with several hard bounces on the runout, brought about recommendations to strap the bombardier window doors together in the Training Command. In addition, the AAR Board pointed up elements of crash procedures and crash boat requirements.

While taxiing toward the ramp area after landing, the bombardier window door came open due to bent locking pins. The pressure of water against the glass shattered the window. Sea water flooded the bow and galley compartments, despite efforts to stuff a mattress in the hole, to the extent the propeller blades were bent upon striking the water while taxiing.

In analysis, the board said, the primary factor causing the accident was pilot error in that he failed to maintain a proper landing attitude. Most of the damage was caused by flooding and partial submersion. Contributing factors which permitted this damage were:

(1) Though the electrical bilge pump was in good mechanical condition, it was not primed properly to operate. As a result, only the hand pump was put into operation.

(2) Of the two crash boats on the scene neither was equipped for pumping operations, nor were they properly equipped for towing operations.

Damage due to taxi and during ramping would have been minimized had high speed pumping facilities been available and/or proper towing equipment been available and used. ●

VR

R5D

WET RUNWAY — Following a normal approach and touchdown to a 8000-foot wet runway, an R5D began a slight veer to the left. The pilot corrected the veer with rudder, but as the nosewheel touched down the veer began again and was uncorrectable by nosewheel steering. (The nosewheel strut was not depressed sufficiently to unlock the centering cams to allow the steering mechanism to operate.) Despite right rudder and right brake, the turn to the left continued until the plane left the runway, plowing into soft ground until the nosewheel was sheared.

This experienced pilot failed to utilize all means of rollout control.

The investigation pointed out that:

1. At no time was engine power applied to offset the swerve, although some 4000 feet of runway remained available.
2. Full right brake was not available because full throw right rudder was being applied.
3. It was recommended that multi-engine training syllabi include an addition to the after-landing checklist of brakes available and steering available.

In this case the pilot was highly experienced, proving that there is no stage in aviation experience beyond which "It can't happen to you!" ●

HU

HO3S

ROAD BLOCK—Taking off from a West Coast air station in an HO3S the pilot headed east toward mountainous terrain. Prior to takeoff an altimeter setting was obtained and checked for field elevation. To facilitate navigation the pilot planned to intercept and follow a main highway through the mountains.

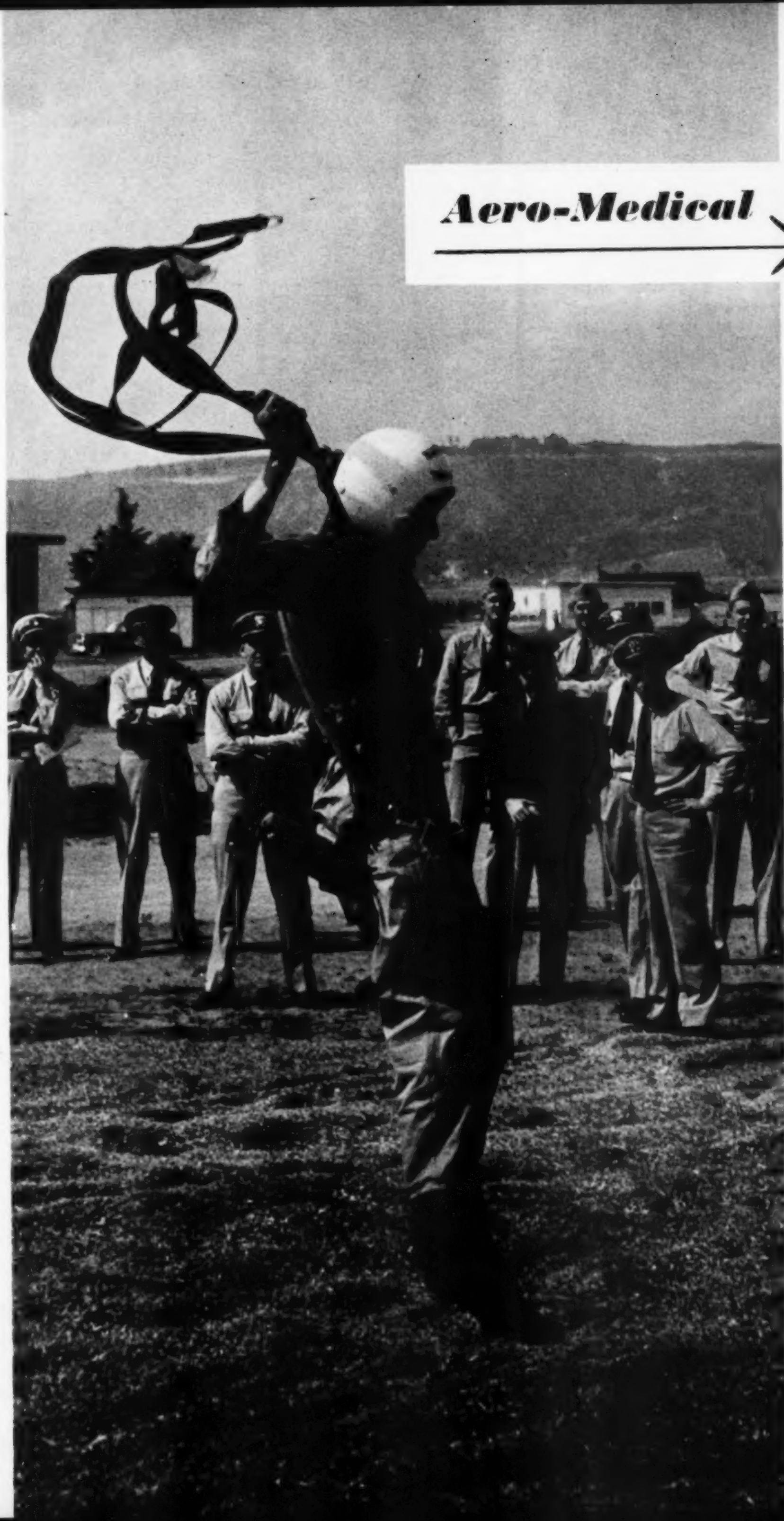
The flight proceeded along the highway for approximately 15 minutes with the pilot estimating about 500 feet clearance over the surrounding terrain when he felt a jolt which was similar to a very severe gust. Controls and instruments continued normal. The passenger reported that he thought the main rotor may have hit telephone or electrical wires as he momentarily caught a slash of sunlight off some wiring leading to the helicopter just before the contact.

It took several minutes to find a landing area where the aircraft landed and was inspected. Although the leading edges of the main rotor blades were dented no internal damage was visible so the pilot elected to return for repairs. One main rotor blade was found to have dents up to one-half-inch in depth.

At the point of contact the aircraft was approximately 100 yards to the left of the highway, well above the ground which sloped down from the highway. The wires in question extended from a ridge about 500 feet above and to the right of the highway at about a 30-degree angle to a point below and to the left of the highway and aircraft.

As a result of the investigation it was concluded that the pilot erred in his altitude above the terrain. The following recommendations were made: (a) installation of radio altimeters in all helicopters, (b) that helicopters flying over mountainous terrain maintain 1000 feet terrain clearance, (c) pilots exercise caution and good judgment in low altitude flying where unmarked difficult-to-see hazards may exist. ●

Aero-Medical



Whose Hard

PILOTS, while squirming into G-suits and tugging on parachute harnesses, have been known to growl unhappily about being "loaded down with more danged equipment than a knight in armor." At first glance, the comparison might not seem inappropriate, and occasional glimpses of things to come promise even stranger clothing and equipment for the future flier.

The reluctance of the pilot to zipper, button, snap, buckle and fasten himself into the numerous items of today's aviator apparel probably stems from a fond recollection of the good old days. He remembers, or has been told of, the time when a gent could slip on a set of coveralls over his shorts, pull on a suitably colorful cloth helmet (preferably the flight-deck crew type), and roar off into the blue to tilt with the Dame Fortune.

Then, he recalls mistily, a man could roll up his sleeves, bare his manly chest and look mighty impressive with his neck scarf streaming out of the cockpit.

"And," this nostalgic contemporary will remind you, "we didn't have all them gadgets and straps and football helmets and such, neither."

Yessir, them was the days.

Mark VIII Face

Yes, sir, they sure were—the days when a camshaft in the liver was regarded as an occupational disease, and the "Mark VIII Face" was the standard trademark of a fighter pilot—and if you didn't limp a little from a stray piece of spruce longeron in your leg why, son, you just weren't checked out!

Yes, sir, it can be said with nothing but the greatest respect and admiration for those earlybirds, that it was the golden era when almost as many records were broken as heads. It was the fabulous phase that brought flying, literally, into everyone's back yard—and a lot of pilots terminated their careers right there—victims of crashes they might have survived had today's safety equipment been available.

Remember when shoulder straps became standard installation on all Navy aircraft? Why, for the first year or so there was enough canopy plexiglass broken by streaming, unfastened straps, to enclose the infield of Yankee Stadium.

Then the word began to get around that the durned things really paid off—lots of pilots were walking away from very messy crashes. The shoulder straps took hold.

Reluctant Resistance

This pattern of reluctant resistance to change was repeated with other additions to

Crashed *Corsair* pilot survived when hardhat absorbed blow.

Safety equipment enabled the pilot of cartwheeled SNJ to walk away.

Head?

the pilot's equipment wardrobe: The G-suit was eyed with considerable skepticism until its saving virtues became apparent. Pilots took a dim view of the anti-exposure suit at first, choosing to mix an optimistic estimate of their chances with a proportionately pessimistic opinion of the poopy-bag's effectiveness. But the record of survivals became impossible to ignore — so, pilots decided to go along with the program.

The hardhat initially met with similar rebuff — the things were heavy, cumbersome and uncomfortable, and pilots shied away from the bulbous brainbuckets with a natural suspicion of something new. Then, as reports of impressive saves offered convincing evidence of its use, the pilot actually found a reassuring comfort in the unyielding protection of his new headgear and the anti-buffet helmet came into complete acceptance.

Examples of this long and continuing process of equipment evolution are as numerous as the many items of pilot's gear developed. The significance of the examples noted and pictured here should be apparent to pilots.

An AF-2S lost engine power after takeoff, forcing the pilot to make an emergency wheels-up landing in grass field. The aircraft tore through wire fence and posts, skidded through a six-foot thick sea wall four feet high, simultaneously tearing out a section of telephone line. The engine was partially broken from the fuselage. The safety belt and shoulder harness held the pilot securely in his seat. Use of the protective helmet prevented serious or fatal injury since a severe blow occurred to the helmet when the aircraft engine mount and fuselage buckled on impact.

The blow was sufficient to crack the helmet at the forehead level and transmit a blow to the pilot's forehead resulting in only a minor bump on the pilot's head. The proper use of safety equipment also definitely prevented serious injury to the passenger.

Just remember that your equipment and flight gear are under constant evaluation for improvements which will answer the increasing problems of today's and tomorrow's flying. Each article, every item of your flight and survival gear was carefully designed for one specific purpose: *To enable you to perform your function, and live.*

As newer and more efficient ways of keeping you effective are offered, accept them and use them in the manner for which they were intended. Be alive to the possibilities of your equipment — and be alive. ●

Personal safety and survival equipment play an important part in the two

AJ-2

REFUSAL of tiptanks to transfer fuel, coupled with the partial loss of power on the starboard engine, provided an emergency situation for an AJ-2. These events followed completion of a bombing mission on a surface force.

Because this lack of fuel eliminated the possibility of return to its landbase, and because darkness was anticipated on the return flight, the pilot of the AJ elected to make a controlled ditching during daylight near a merchant ship.

Preparations for the ditching were thorough and unhurried since more than an hour was available. All parachute harnesses were unsnapped and the pararaft connecting cords to Mae Wests were unhooked. Oxygen masks were taken off. It was decided to remove all personal gear except the shoulder harness and safety belt. (The AJ carries no survival gear other than the pararaft attached to the parachutes.) Arrangements had been made for an accompanying P2V to drop a life raft and additional Mae Wests after the crew were in the water. All loose gear was stowed and the tracking lever between the legs of the bombardier - navigator was removed.

After a final circle of the merchant ship, all three canopy hatches were opened, and the third crewman put the flaps down full, using the emergency hydraulic system because of loss of pressure in the main system.

The pilot had elected to make a power approach using partial power on the defective starboard engine. As he approached the ship he noticed the vessel had turned about 45 degrees, unintentionally creating a slick in which the pilot intended to land. Fuel state on landing was estimated at 800 pounds. Tiptanks had been jettisoned during circuits of the ship.

At about 30 feet altitude, propellers were feathered and the aircraft struck the water about three seconds later. The plane hit the water tail first at about 85 knots. There was only one impact noted and very little forward movement followed.

The decision to feather the propellers had been influenced by reports of several instances of shattered blades entering the fuselage in the vicinity of the crew. The prop blades stopped on impact and the tips were bent back but not shattered. Canopy hatches stayed open. The canopy on the bombardier's side shattered in several panels, and the plastic nose sheared off.

On the impact, the cockpit immediately filled to chest level with water entering through the ruptured bulkhead in the nose and through the door to the bomb bay compartment which probably flooded on impact.

The pilot and bombardier left the cockpit without difficulty, but the third crewman riding back of the pilot facing aft was almost pinned in his seat by the electrical panel which came loose and moved forward very close to his chest. The water was up to his neck and, had his parachute been secured to him, it is believed he would not have been able to free himself from the seat. All three crewmen left the cockpit immediately through their respective hatches and thereafter inflated their Mae Wests.

The pilot removed his hard hat and boondocker shoes; the other two crewmen left these items on.

The airplane remained afloat approximately 10-12 minutes in a slightly nose-down attitude. The sea swells were about 10 feet high and the wind force was about seven knots. Water temperature was 72°; air temperature 65°.

The P2V made a good drop of the MK IV liferaft and afterwards dropped additional inflated Mae Wests.

A life boat from the mer-

The information contained herein is interesting and convincing proof of the

the two ditching accounts. Both are the first ditchings of each type aircraft.

chant ship picked up the crew after about 15 minutes in the water and 15 minutes in the raft. There were no injuries, and all personal and survival equipment functioned properly.

One further note is passed along from the crew of the P2V which monitored the emergency and relayed information to the home base: Although some difficulty was experienced initially in contacting the surface vessel, excellent communications were established on 500 kc.

S2F

RETURNING to the carrier from a routine VFR day ASW flight, an S2F lost power on the port engine and shortly thereafter began losing power on the remaining engine.

Realizing that he could not get back to the ship, the pilot passed the word to the crew to prepare for ditching. Crew members went over ditching check-off lists at each station and jettisoned hatches. While making a gentle turn into the wind, the pilot was forced to push over violently when the failing starboard engine appeared to be dragging the plane to a stop. The starboard propeller was feathered and a rate of descent set up at an air speed of 95-100 knots, with full flaps and hook down. The wind was 19 knots.

The pilot began to flare the plane at about 50 feet, and when he felt the tail hook drag he eased up the nose. When the tail hit the water he pulled the nose as high as he could and flew the plane into the water at what appeared to be a fairly level (five-degree) attitude. Impact speed was estimated at about 85 knots and a "comparatively smooth landing was made with a good degree of control available just prior to touchdown."

The radar and ECM operators were first to leave the plane, followed by the pilot and copilot. During the time that the plane remained afloat, approximately one and one-half minutes, the MK IV life raft was inflated and the copilot, who had been slightly injured, was placed aboard; evacuation by entire crew was accomplished in a few seconds. The crew was in the raft only about 10 minutes before the helicopter arrived.

Personal safety equipment was effectively used by all survivors with exception of the copilot who did not have on flight gloves, nor was his helmet secured. He received a broken finger, lacerations of the scalp and abrasions of the arm and hand.

Long training in standard emergency procedures made for efficient action and eliminated confusion.

The pilot noted four important points to be remembered by other S2F pilots faced with a ditching situation:

1. For a power-off or dead-stick landing, a steep glide angle must be maintained to the point of flareout.

2. Judgment of exact height above the water may be difficult and, in this case, the lowered tailhook helped to predict the moment of impact.

3. If flareout is begun too early, it is necessary to nose over slightly to maintain sufficient speed for control after entry into the water.

4. The pilot must continue to fly the airplane after initial impact until it comes to a completely stopped position.

Other comment made by the pilot includes: "Two-thirds flap would have made the landing easier as the nose would have been in a higher attitude. A primary consideration is to maintain flying speed. In a situation where partial or full power is available, the landing should be made at the slowest speed commensurate with complete control, and the aircraft flown until it comes to a complete stop." ●

of the value of good techniques properly developed by frequent drills.

flight surgeon's NOTEBOOK

DITCHING TIPS

The pilot of an F7U made an excellent shallow-water ditching, and describes the impact and deceleration as "similar to that of an arrested landing." He thought he had it made. He released his seat belt—and couldn't stand up because the shoulder straps were not completely free.

Recommended ditching procedure is to throw the straps well clear before attempting to leave the cockpit.

In this case the plane stayed afloat long enough for the pilot to free himself, and he waded ashore. Frequent ditching drills will make the proper procedures automatic.

SURVIVOR'S SEA TRAIL

When a plane is searching the sea for survivors it is easier to sight an objective three feet wide and three miles long than to sight a raft 2½ by 4½ feet.

The moral is, *trail a dye marker* behind your drifting raft. The dye will remain visible an hour or more except in rough seas and in that hour you will have drifted about three miles leaving your green trail behind.

The marker will continue to stain the water for a minimum of three or four hours if you open the flap very slightly—just enough to leave a trail. In a moderate sea it will last only 20-30 minutes if you open it completely.

It is suggested that the marker be removed from the water at sunset to conserve the chemicals. Place it in the water again an hour before sunrise so the maximum length of trail will be laid by the time it can be seen.

If you have to use the shark chaser, try to keep it to one side or under the dye as the black shark chaser will obscure the green dye.

KICKS, THE HARD WAY

Aero-medical analysts in commenting on a recent TV ejection noted that the pilot sustained serious injury because he elected to use his *own* ejection seat sequence. The TV-2 Handbook states that the canopy will be jettisoned before raising the rests.

This TV pilot stated that he intended to jettison the canopy after raising the arm rests because he thought that air stream might hinder his pre-ejection procedures. But in raising the right arm rest he unintentionally fired himself through the canopy, fracturing a vertebra.

Every pilot should mentally rehearse his ejection procedures at the start of each flight to avoid the occasion for confusion, indecision, or last-minute inspiration on the best ejection procedure.

And the pilot who makes a decision that he will use a sequence of his own should discuss it with his safety officer.

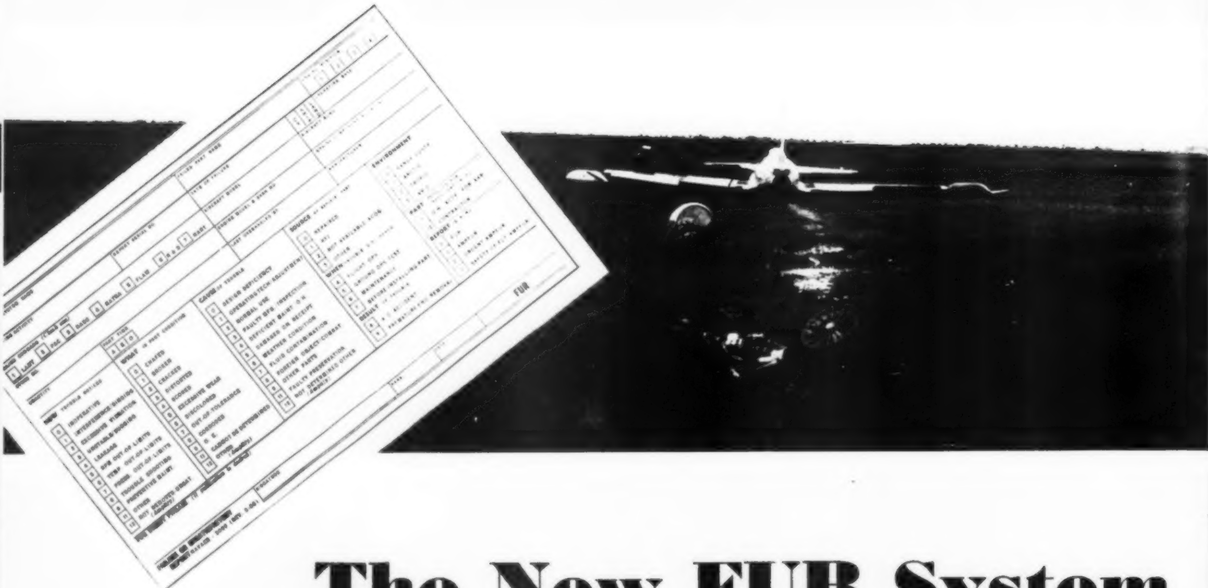
If he has a better way, his fellow pilots throughout the Navy should be able to share the benefits. And if he is wrong, the consequences can be explained to him before he learns the hard way.

BORROW A TOOTHBRUSH?

Does your oxygen mask leak? Feel uncomfortable? — Maybe it isn't yours. Several recent accident investigations, one a fatal case of anoxia, have revealed that pilots are flying with borrowed masks.

An oxygen mask should be as personal as your toothbrush. If you don't have a mask, or if yours is not available for any reason, bring this fact to the attention of your safety officer. He will assist you in procuring a new one, if necessary, and will probably arrange the schedule so that you will not be required to go to altitude before you get it. Do not fly with a borrowed mask. ●

Maintenance →



The New FUR System

MAYBE you are one of the hundreds of individuals who (a) continually wonder what happens to all those material failure reports that maintenance people are required to submit, or (b) are you one of the many skeptics who growl "What's the use of sending failure reports when nobody ever does anything with them?" or (c) perhaps you may be the lazy type who tags all material failures "isolated cases" to avoid having to fill out those tiresome forms. Or (d) you may be among the ever-present two percent who just don't know a material failure reporting system even exists, and don't particularly care.

Whether or not you fall into one of the above categories, if you're at all concerned with aircraft maintenance, we have news for you—good news! Listen!

The subject is Failure or Unsatisfactory Report of Aeronautical Material, and the object is to acquaint you with this new FUR system developed by the Bureau of Aeronautics. The system was designed as a simple, effective and versatile means of reporting and following up all failures of aeronautical material.

For the complete story on the FUR system, BuAer Instruction, NavAer 00.58A of 20 May 1955 should be consulted. Any correspondence concerning the FUR system should be addressed to BuAer (Aer-412). Comments are invited by this office.

The New System

Briefly, there is a very short report for minor failures, but also provided is an amplified report with discussions and pictures for more important failures, and there is a dispatch report for safety-of-flight failures. Each report is made on an easily filled out IBM form which provides simple means of transfer to IBM cards for quick, ulcer-free analysis (See Fig. 1). Just a look at Fig. 1 should convince you that here, at last, is a form which you can fill out quickly and without reference to a baker's dozen of instructions and directives. And it's that way because it was designed for you—custom-built to your specifications. However, don't underestimate the importance of the correct stock number and overall accuracy of the report—the FUR is of no value without the correct stock number.

About the only other thing you could possibly desire would be the assurance of action and follow-up on your report—hmmm? This is provided by a weekly machine listing of FURs, called the *FUR Digest*, which is distributed to

all concerned squadrons and aviation activities. Included in the *Digest* are comments and special notes on significant trends and corrective action. If you aren't getting to see the *Digest*, ask your maintenance engineering officer or chief. In short, here is a means for positive prevention of aircraft accidents *before* they happen.

How It Works

Now, to see just how the system works, let's briefly follow the sequence of action on a failure report as it is processed through the system. When a material failure or unsatisfactory condition occurs, the reporting activity must decide its importance and place the report into one of four categories, as follows:

(*a*) FUR—A minor item requiring only the pre-coded form.

(*b*) AMPFUR—A more important item requiring amplifying information on the back of the pre-coded form.

(*c*) URGENT AMPFUR—An important or critical item requiring immediate attention. (Submitted by dispatch to BuAer, info cognizant commands, and followed up with a regular AMPFUR.)

(*d*) Safety-of-flight AMPFUR—A very important item involving safety of flight, requiring immediate attention and special action. (Submitted by dispatch to BuAer, info the Naval Aviation Safety Center and cognizant commands. Followed up with a safety-of-flight AMPFUR.)

These categories assure that the properly reported failures get the proper *priority* and *action*. For the sake of expeditious handling of FURs at the FUR Center it is mandatory that the reporting activity use its abbreviated name: for example, VF-21 for Fitron Twenty-one.

Reporting activities prepare only four copies (Fig. 1) which are provided in special pad forms with carbons. It is absolutely essential that the information be neat, accurate and complete. It is also necessary to identify the report as FUR, AMPFUR, urgent AMPFUR or safety-of-flight AMPFUR, which will determine its final disposition. Photos and amplifying information may be attached.

Red Tape Eliminated

Since timely reporting of failures is essential, it is to be noted that no requirement as to submission through overburdened administrative departments is required. All that's needed is the signature of a responsible authority (such as the maintenance engineering officer).

All reports (except dispatch reports) are mailed daily to the FUR Center, ASO, 700 Robbins Avenue, Philadelphia 11, Pa., for processing. Overseas reports are sent via airmail. The FUR Center prepares IBM filmsort cards (ordinary IBM cards with microfilm inserts) which permit rapid extraction of desired information (see Fig. 2), and duplicates are sent to BuAer and other activities such as the NASC and manufacturers as applicable.

Facilities have been provided to all recipients for analyzing and following up these reports. As previously noted, each week a digest of AMPFUR Reports received is made, by model of aircraft, and distributed to all concerned squadrons and activities. In this way, every aircraft operator is informed that his reports are being received, and at the same time gets the complete picture on failures occurring in similar squadrons. Here is ACCIDENT PREVENTION in capital letters—all on a silver platter, or rather a printed sheet.

Even though the FUR system has been in effect only a short time, many significant trends are being established and timely corrective action is being initiated as a direct result of its function. The new system went into effect Navywide on 1 June 1955, after a shakedown period of several months in selected advance squadrons.

It is estimated that thousands of reports may be received yearly under this system. This makes it essential to employ modern statistical machinery capable of handling an immense amount of information. The result is safer, more effective aviation for *you*.

You asked for this system; you suggested how it might be developed, so, why don't you get out the instruction today and do a little studying to see just how simple it really is and how effective it can be *if you do your part*. Your only responsibility is timely and accurate reporting on a very simple form.

Safety officers' Notice: Squadron safety officers are urged to help train their maintenance personnel in the elements of this system. Remember, this is *your* life! Report properly and fly safely! ●

This Banshee fell victim to a neglected teleflex check.

Effective operations depe

FROM THE

Ground

F9F

IDLE DETENT—Reports from the field indicate that some F9F operating activities believe the idle detent is set at the factory and should not be changed. Still others are obtaining the desired RPM by making the adjustments at the throttle detent only.

The proper procedure is outlined in the Maintenance Instruction Handbook for the F9F-6 ANO1-85FGD-2, page 368, paragraph 5-85F. "Set the movable idle detent to the most forward position at which stabilized idle RPM can be maintained (remain on fuel control dead band.)" The dead band is the range between cutoff position and the pickup point from idle. This range is determined by idle adjustments made at the fuel control.

Proper sychronization of the detent setting with idle adjustments on the fuel control can be checked. At idle move the throttle about 1/8-inch below the horn (idle detent) and note any drop in RPM. A drop will indicate the control is not on dead band. With proper adjustment the RPM will remain constant until shut down.

In the event that a new fuel control is installed, it is possible that the idle detent is a little too far forward and the fuel control would not be on the dead band. This would result in an excessive idle RPM at high altitude in both primary and emergency. Excessive idle RPM in an emergency would make a relight difficult. ●

F2H

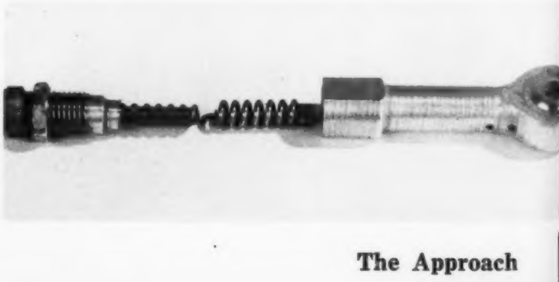
ADD TELEFLEX CHECKS—The pilot of an F2H on retarding the throttle to IDLE experienced difficulty in slowing the aircraft after landing. Approximately half-way down the runway he observed his port engine was reading 80 percent power. He elected to remain on the ground and began applying brakes. The *Banshee* veered off the runway to starboard and rolled 375 feet through the sod before it struck a concrete storm sewer manhole. The impact caused damages to the plane totalling an estimated $94,700.

Pilot error was involved to the extent that the pilot failed to shut down the engine by turning off the fuel valve.

Post accident inspection findings;

The port engine would not cut off with the throttle in the OFF position because the telescopic unit of the engine control had separated at the quadrant end of the control. The separation was caused by the jam nut loosening al-

Add teleflex check to your Banshee inspection form.



d Up

Notes and Comments on Maintenance

Vacuum pump drive gear spacer was too thick.

lowing the end of the fitting to separate from the slider tube.

The exact moment of the control separation is not known but believed to be prior or immediately after the first contact of the runway. The position of the separation was such that when the pilot placed both throttles to CUT-OFF position it had no effect on the port engine. The only other way remaining to secure the engine was to close the fuel master lever. The pilot neglected to use this method as the port engine was still running when the plane came to a stop.

The jam nuts on the engine controls were not inspected during the acceptance check or on two subsequent inspections. Inspection of these nuts did not appear on any inspection form, are not readily accessible and have never previously given an indication of malfunctioning.

The accident board recommended that: (1) All pilots be instructed in the necessary action to stop a runaway engine in this model aircraft.
(2) All Teleflex connections in all F2H aircraft . . . be inspected.
(3) The inspection of Teleflex connections be incorporated in all major and intermediate inspection forms.
(4) The details of this accident be disseminated to all commands having F2H aircraft onboard. ●

HO3S

DUNKED HELICOPTER—Fuel pump failure which was precipitated by the use of a vacuum pump drive gear spacer of too great a thickness resulted in an engine failure and a dunking of rescue helicopter. The HO3S was on a mission to rescue the crew of a sinking PBM whose bombardier's window had carried away during a rough water landing (see VP, page 21).

While the 'copter hovered over the seaplane with cable reeled out and just as a crewmember reached for the hoisting sling, the engine failed. The helicopter settled into the water in a level attitude, rolled left and sank. Its crew was picked up by a crash boat.

Class A damage amounting to $85,000 was sustained due to salt water immersion.

The AAR Board recommended strict adherence to tolerances contained in overhaul instructions by overhaul and service activities.

HRS/HO4S

LOSS OF ROTOR POWER—Numerous cases of loss of power to the rotor (excluding engine failure) have occurred in the HRS/HO4S helicopters which resulted in forced landings or accidents. An investigation of one of the forced landings disclosed the loss of rotor power was due to the failure of the free wheel unit. The S14-35-3013 sprocket had failed in fatigue at the 1/16-inch blending radius of the web. The

FROM THE GROUND UP, (Continued

contractor's investigation indicated that the failure may have been caused by use of a locally manufactured aluminum ring in place of the nylon S14-35-3066 ring or copper and asbestos S14-35-3036 ring assembly. Since aluminum does not possess the shock absorbing characteristics of nylon or copper and asbestos rings specified by the contractor, this results in a shock loading of the sprocket due to vibration of the engine. (Refer Sikorsky Aircraft Letter SSD-4230 ComAirPac General Aircraft Maintenance Bulletin No. 14-55).

If you must manufacture a part locally, don't try to rely on memory. Assume nothing—consult the proper MIL Spec. or drawing. ●

AD

CHECK 'EM ON THE 120—This episode reminds us of times when we had extra dough stashed away in the secret compartment of our wallet and just about the time it's our turn to spring for the round, in comes the wife. Might as well not had it just then 'cause we couldn't use it!

This is just about the fix this pilot was in, only worse—he had fuel to make it around, but it was in a secret compartment and he couldn't use it!

After taking off in an AD with a full tank of fuel, by gage and by sight, the pilot landed his plane at another airport one hour and 16 minutes later. He had 1500 pounds (indicated) of fuel left for his return flight. The fuel consumption of 700 pounds was consistent with the power settings used.

After 45 minutes on the return leg the fuel gage suddenly dropped from 1000 to 500 pounds. Nearing his base the pilot called the tower for landing instructions. His fuel gage read 470 pounds. Almost immediately the fuel gage began to indicate a steady drop at the rate of approximately 250 pounds per minute. Moments later the fuel pressure dropped and the engine quit of fuel starvation. Seeing that he could not reach the landing field he elected to ditch the plane. The pilot and his passenger escaped and were rescued shortly after.

The primary cause was determined to be material failure of the main fuel cell. Fuel collected between the *inner* and *outer* liners of the fuel cell. This caused the *usable* volume of the fuel cell to be restricted and also caused an erroneous reading on the fuel indicator.

Inspection and tear down of the fuel cell revealed that failure was due to small holes in the inner liner caused by abrasion of undetermined cause. The holes in the inner liner allowed small quantities of fuel to seep between the inner and outer liner and dissolve the binding cement.

Upon subsequent refuelings this situation was aggravated until a blister was formed that held approximately 75 gallons of fuel. The blister was of such proportion that it restricted considerably the usable area of the bottom of the cell. This situation could not be noted on the fuel gage as the gage unit records the fuel level instead of capacity. The blister being larger at the bottom than at the top, would allow a near normal rate of fuel consumption indication until the fuel level reached the larger proportions of the blister at which time the fuel consumption indicator should increase.

Since this article was first prepared, another AD aircraft was ditched under similar conditions. While the aircraft was not recovered, and it is not known if fuel cell failure was the cause, the pilot's report of events leading up to the engine stoppage indicated strong suspicion of it.

The preventative measure recommended by the accident board in the first case, requires that strict compliance with para. 4-728A-C of the E&M Manual for AD-4 aircraft be followed. In concerns inspecting the fuselage fuel cell during the three-month capacity check. It was further recommended that the inner liner be inspected for holes, abrasions and blisters on each 120-hour inspection.

It was also noted that all self-sealing tanks that have an independent filler cap, regardless of type aircraft, require this inspection according to NAVAER 03-10-513, page 9, paragraph 2c. ●

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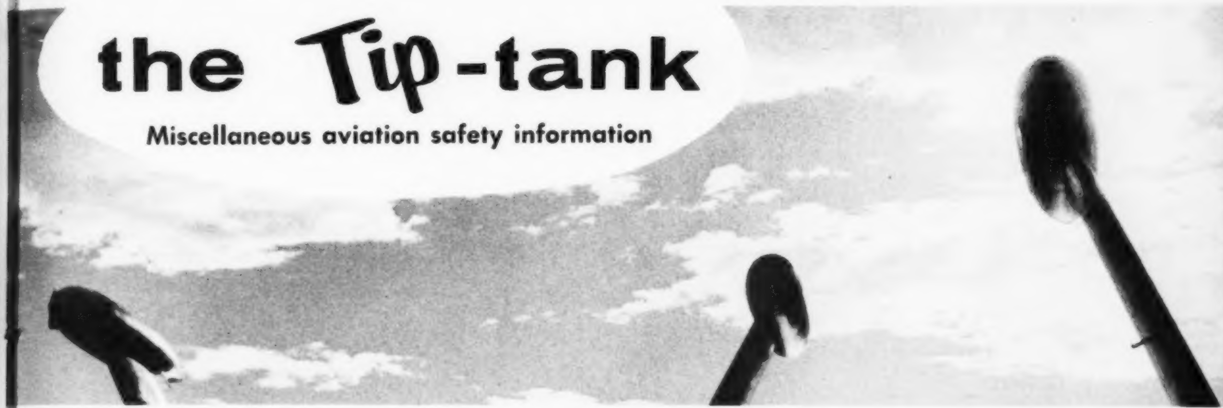
Miscellaneous aviation safety information



HELMET TIPS

H-3 liners can be used with H-4 helmets, but you should cut off the stabilizer straps so they don't dangle in your eyes. And it is not recommended that you tuck the straps inside unless you are striking for dimples in the skull—better known as holes in the head!

If this helmet and liner combination does not feel stable it is probably because of improper sizing or inaccurate fitting.

However, if you prefer, you can put snaps on the outer H-4 helmet shell by following the procedure for modifying the H-3 shell, as described in Clothing and Survival Bulletin 20-54. This modification will not decrease the protective capacity of the helmet.

WANT FLAMEOUT DETAILS WITH DISPATCH

BuAer recently cited the increasing need for more complete information from operating activities when reporting flameouts. All of the possibly relevant information should be provided promptly in the AMPFUR to insure early and accurate analysis.

Included in the suggested reporting procedure are the following items: (a) Fuel status at flameouts (b) Altitude at flameout (c) Oil pressure at flameout (d) Condition engine igniter plugs (e) Stock number engine igniter plugs (f) Stock number fuel regulator (g) Engine serial number (h) Condition fuel boost pumps (i) Condition fuel filter (j) Any other information relative to abnormal findings following flameout or operations prior to flameout.

For more complete information please refer to FUR Digest 13-55.

BLACK BLINKER

He was way up there where oxygen is essential. His blinker regarded him with an ominous, unwavering *black* stare. But he continued his flight without concern—because he had an automatic positive pressure oxygen system and his flight surgeon explained that automatic positive pressure systems do not blink above 41,000 feet!

When a blinker is operating, it is the black which indicates flow, the white indicates no-flow. Therefore on automatic positive pressure at high altitudes the blinker stays black because the flow is continuous. You can feel the pressure and be sure you're getting oxygen.

However, some of the very latest model regulators, *of the P series,* are designed so that blinking continues at all altitudes. If you have any doubt about what kind of regulator you are using, ask your flight surgeon or safety officer. ●

POSTER IDEA

Extra pictures and copies of old AARs can be made into excellent safety posters, one squadron reports. It was noted that a picture of a damaged aircraft with a brief of "wha hoppen?" certainly catches the eye. ●

Well Done!

LTJG Arthur Carpenter

AT 45,000 feet, some 25 miles southeast of Clear Lake, California, LTJG Arthur Carpenter, of VF-94, found that the engine RPM of his FJ-3 did not respond to throttle. On retarding to idle position, the engine oversped to 104 percent. Extending speed brakes, Carpenter began a let down to the nearest field, NAS Moffett. Engine RPM stabilized at 98 percent during descent.

At 20,000 feet Carpenter reduced airspeed with a sharp pullup and a nose-high attitude and lowered gear, flaps and hook. During the remainder of the descent, prescribed airspeed was maintained by steep bank, steady G turns. A tight 360-degree turn over the approach end of the runway accomplished a reasonable approach speed, and the landing approach was a tight 360-degree turn to the right at 800 feet over the approach end which served to avoid a long straightaway and kept the approach speed to about 170 knots. At completion of the turn, and safely over the end of the runway, the throttle was placed in the shut-off position. Touchdown was made at approximately 130 knots, well down the runway. Field arresting gear was engaged and the aircraft was stopped with no damage. Preliminary investigation indicated that the fuel governor spring of the fuel control unit had broken, causing a maximum fuel flow.

Simple, neat and uneventful almost to the point of a routine operation—until it is noted that LTJG Carpenter had logged a grand total of only 346 flight hours, and he had only 7.4 hours in type. THE APPROACH considers LTJG Arthur Carpenter's action an encouraging example of the positive approach to aviation safety. Well Done!

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